

THE CLAIMS

What is claimed is:

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1. A medicament cartridge for an injection system comprising:
a medicament;
a tube having first and second ends and a lumen with a longitudinal axis for retaining the medicament therein;
a needle operatively associated with the second end of the tube and having a piercing end extending into the lumen;
10 a first stopper within the lumen located near the second end moveable within the lumen along the longitudinal axis; and
a second stopper within the lumen located near the first end moveable within the lumen along the longitudinal axis,
15 wherein, relative movement between the first stopper and the needle causes the piercing end of the needle to pierce the first stopper to create a fluid pathway for the medicament through the needle and movement of the second stopper toward the second end of the tube compresses the medicament held between the second stopper and the first stopper so that the medicament is expelled through the fluid pathway.
 - 20 2. The medicament cartridge of claim 1, wherein movement of the second stopper toward the second end of the tube compresses the medicament between the first stopper and the second stopper to move the first stopper toward the second end of the tube to allow the piercing end of the needle to pierce the first stopper and
25 create the fluid pathway for the medicament through the needle.
 3. The cartridge of claim 1, wherein the piercing end of the needle has a bevel.
 4. The cartridge of claim 1, wherein the needle has an injecting tip extending
30 beyond the second end of the tube.
 5. The cartridge claim 1, wherein the injecting end of the needle has a bevel.
 - 35 6. The cartridge of claim 1, wherein the tube is cylindrical.

7. The cartridge of claim 1, wherein the lumen has a portion with an enlarged diameter, and further comprising a third stopper within the lumen located between the second stopper and the enlarged diameter and moveable within the lumen along the longitudinal axis.

8. The cartridge of claim 6, wherein a first medicament component is present between the second and third stoppers, and a second medicament component is present between the third and first stoppers, such that, movement of the third stopper to the enlarged diameter portion allows the first and second medicament components to mix to form the medicament.

9. The cartridge of claim 1, wherein the first stopper has a frustroconical shape.

10. The cartridge of claim 1, wherein the second stopper has a medicament contacting surface configured and dimensioned to mate with the frustroconical shape of the first stopper to minimize volume of medicament remaining in the lumen after the injection is completed.

11. The cartridge of claim 1, wherein the first stopper has a dimple and narrow cross-section where the needle penetrates the first stopper.

12. The cartridge of claim 1, wherein the lumen has a cylindrical shape.

13. The cartridge of claim 1, wherein the cartridge is used in combination with an injection device.

14. The cartridge of claim 1, further comprising a member operatively associated with the second end of the tube, wherein movement of the second stopper toward the second end of the tube moves the tube into the member to allow the piercing end of the needle to pierce the first stopper and create the fluid pathway for the medicament through the needle.

15. The cartridge of claim 1, wherein the medicament is a liquid pharmaceutical preparation containing insoluble particles.